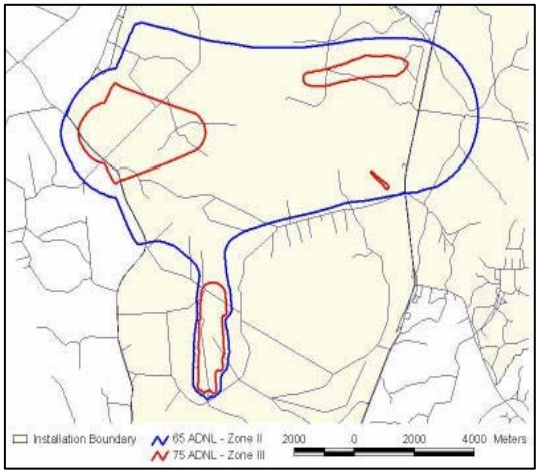
US Army Corps of Engineers®
Engineer Research and Development Center

SARNAM — Small Arms Range Noise Assessment Model

Technology

SARNAM is a software application that provides the capability to calculate and display noise level contours for firing operations at small arms ranges. SARNAM accounts for statistical variation in received noise level, and is intended primarily for the purpose of obtaining long-term noise exposure assessments for a protracted training schedule. A feature known as ONESHOT provides a statistical prediction of noise level at a particular location for individual firing events. SARNAM considers type of weapon and ammunition, number and time of rounds fired, range attributes such as size and barriers, metrics and assessment procedure. SARNAM accounts for spectrum and directivity of both muzzle blast and projectile bow shock, which facilitates accurate calculation of propagation and of sound attenuation by barriers. Source model parameter values are based on empirical data. The propagation algorithm assumes a moderate downwind propagation condition based on sophisticated calculations and experimental data to obtain a mildly conservative assessment of noise exposure. SARNAM offers a choice of single event metrics including sound exposure level (SEL) and peak, as well as average metrics such as day-night noise level (DNL). SARNAM features a user-friendly point-and-click graphic user interface, pull down menus, a help feature, and is designed to maximize user productivity. A library of database records, including weapons (military and commercial), metrics and frequency weighting filters, is included as part of the software package, and the user can define and store additional entries. Calculated noise contours are displayed via the NMPlot software application (developed for the U.S. Air Force and the U.S. Federal Aviation Administration). Using NMPlot enables noise contour results to be combined with those from other Federal noise models to obtain cumulative noise exposure assessments. Results can be ported to a Geographical Information System (GIS) system via AutoDesk Drawing eXchange Format (DXF) or Environmental Systems Research Institute, Inc. (ESRI) “Shape” (SHP) file formats.



Problem

Rifles and pistols are fired extensively at small arms ranges for purposes of military and law enforcement training and for recreational and competitive shooting. Noise from small arms ranges often annoys people living in the surrounding community. Their responses may include annoyance, noise complaints, political pressure, legal action, and efforts to curtail the firing activity.

SARNAM helps quantify the noise impacts of small arms fire.

Expected Cost To Implement

SARNAM software is currently available free to government users. The software application runs under Windows 95/98/NT/XP/2000 operating systems on typical desktop computers. Significant time investment is required to become pro-

ficient in using this sophisticated software.

Benefits/Savings

SARNAM quantifies small arms range noise impact. This facilitates noise management and planning for existing and new ranges, to sustain training capability. Noise management capabilities include assessing long-term community noise impact, examining noise levels due to a particular firing event, planning range operations, and exploring noise ramifications of range design options such as siting, orientation, and placement of barriers and safety baffles. Noise assessment capability is an essential part of an encroachment management program, which can prevent noise complaints and preclude the need to purchase noise-impacted land. The complexity and computational labor of calculating noise contours demands a computerized tool for cost-effectiveness and practicality.

Status

SARNAM is the result of 6.1 basic and 6.2 applied research and development. SARNAM software is currently available to government users from the listed ERDC POC. Blast noise assessments and noise impact management planning, using SARNAM and other noise management technology, are available from the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) Environmental Noise Program.

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ERDC POC

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Distribution Sources

SARNAM software is currently available to government users on request from the listed ERDC POC.

Available Documentation

The SARNAM program is packaged with a getting started user manual and a help feature. Limited technical assistance is also available through the USACHPPM Environmental Noise Program, which can be contacted through e-mail at: NoiseQuestions@AMEDD.ARMY.MIL

Available Training

No formal classroom training is currently resourced. However, limited technical assistance may be requested through the USACHPPM Environmental Noise Program. Some introductory familiarization is occasionally offered as part of noise workshops.

Available Support

The program includes a getting started user manual and a help feature. Limited technical support for the final version of SARNAM will be provided through USACHPPM. Reasonable assistance is available to government users at no cost. More extensive assistance or training may be available by request on a reimbursable basis.